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ABSTRACT

This document is extracted from a larger work that is a component of Utah's archaeology education program. The goal of the project is educating students to take responsible and thoughtful actions with respect to our archaeological heritage. The document consists of eight lessons on the following topics: (1) why is the past important?; (2) culture everywhere; (3) observation and inference; (4) context; (5) chronology: the time of my life; (6) classification and attributes; (7) scientific inquiry; and (8) "it's in the garbage." Each identifies the subjects in which the lesson could be included such as science, social studies, and language arts. Each lesson lists the skills that will be learned in the lesson including knowledge, comprehension, analysis, application, synthesis, and evaluation. Learning strategies include brainstorming, observation, classification, comparing and contrasting, research skills, categorizing, discussion, scientific inquiry, decision making, problem solving, writing, games, analogy, and forecasting. Each lesson lists its approximate duration and recommended class size. The lessons are illustrated and include activity sheets that can be copied to be handed out to the students, answer keys for the sheets, lists of materials needed for that lesson, and a vocabulary list. The first lesson helps students to begin to discover why people study the past. The other lessons explore how to study the past. Background information, instructions for setting the stage for the lesson, the procedure to be followed in the lesson, closure, evaluation, and each lesson's links to other lessons are included. (DK)

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THE INTRIGUING PAST

FUNDAMENTALS OF ARCHAEOLOGY

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A TEACHER'S GUIDE
for fourth through seventh grades

SO 023 540

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U.S Department of the Interior
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THE INTRIGUING PAST

FUNDAMENTALS OF ARCHAEOLOGY

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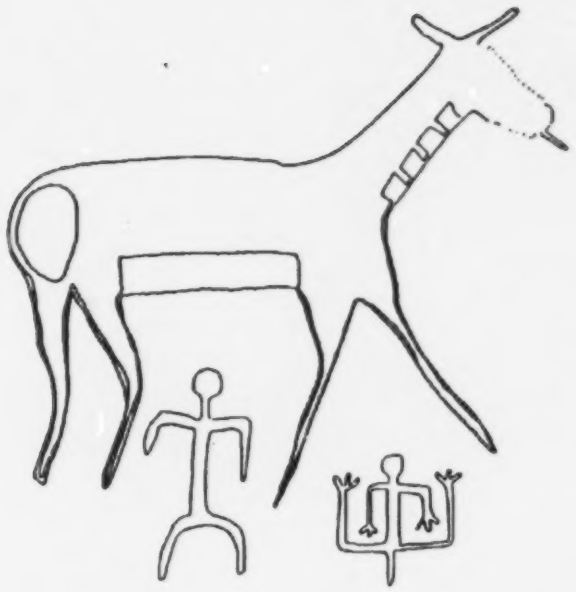
A TEACHER'S GUIDE
for fourth through seventh grades

U.S Department of the Interior
Bureau of Land Management



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PREFACE

The Intriguing Past: Fundamentals of Archaeology is extracted from a larger work, entitled *Intrigue of the Past: Investigating Archaeology*. The latter is a component of Utah's archaeology education program, directed by the Bureau of land Management. Development of the program was sponsored by the Utah Interagency Task Force on Cultural Resources comprised of the Utah divisions of the Bureau of Land Management, U.S. Forest Service, National Park Service, and the State of Utah.

The ultimate goal of Intrigue of the Past is educating students to take responsible and thoughtful actions towards our archaeological heritage. Our nation embodies a remarkable and important record of past cultures, but this fragile record is increasingly threatened. The problem is widespread, occurring throughout the United States (and the world), and affecting all kinds of cultural resources, from ancient ruins to more recent historic ghost towns. A primary means of reversing this trend is education, and actively reaching out to school children.

Many people feel a sense of well being knowing that there are yet places where they can connect with lifeways and people gone by. For some, it is an archaeological site, for others it might be an historic trail. People with an ethnic connection to certain sites can experience a tangible association with their cultural heritage. As a society, we all can benefit from an understanding of how people before us lived in the very places we do today. How did they solve problems similar to ours, what can we learn from their experiences, what is the long term climatic record of a region? The answers to these questions and many others are contained in archaeological sites.

Utah's archaeology education program is directed by the Bureau of Land Management. Shelley Smith and Jeanne Moe (BLM), and Danielle Paterson and Kelly Letts (both U.S. Forest Service), prepared the materials in this guide. Seventy five teachers taught early versions of these activities in their classrooms; their invaluable experience and creative suggestions helped us to refine and improve the lessons.

FUNDAMENTAL CONCEPTS

1

WHY IS THE PAST IMPORTANT?

SUBJECTS:	Science, social studies
SKILLS:	Knowledge, evaluation
STRATEGIES:	Brainstorming, discussion
DURATION:	15 to 30 minutes
CLASS SIZE:	Any; groups of 3 to 4

Objective

In this introduction to their study of Utah's archaeological heritage, students will use a personally owned object to:

1. Share the importance of their past.
2. Connect this importance with reasons why the human past is important.

Materials

Students bring to class an object, photograph, or drawing that represents their past.

Vocabulary

archaeological site: a place where human activity occurred and material remains were left.

archaeology: a method for studying past human cultures and analyzing material evidence (artifacts and sites).

artifact: any object made or used by humans.

Background

Sites and artifacts can be messengers from the past. If we know how to read their messages, material remains can tell us about the people who made and used them and then left them behind. Although the owners of the artifacts and the inhabitants of the sites may have lived hundreds or even thousands of years ago, they undoubtedly had many of the same needs and concerns, hopes and fears, joys and sorrows that we have today.

The messengers from the past belong to everyone. Everyone has a right to know how the world came to be and to know his or her place in the world. Material remains and their context play a universal role " . . . in providing cultural continuity and perspective, and hence in linking past, present and future within the experience of any given human generation" (Lipe, 1984, p. 2).

The link to the past is provided through scientific analysis as well as through traditional values placed on archaeological sites and artifacts. For example, Pioneer Trail State Park provides a tangible link to the settler history of Utah and it is valued for that reason. By examining historic buildings and objects, the park might also provide scientific information about the lives of the settlers. Similarly, some prehistoric sites in Utah may represent the heritage of American Indians and are valued accordingly. These sites are also capable of providing scientific information about the prehistory of the region.

Setting the Stage

This lesson sets the stage for Section One. It will help students to begin to discover *why* we study the past. The remainder of Section One explores *how* we study the past.

Assign the students to bring an object (artifact) or photograph from home that tells about their family's past. If the object cannot be brought to class, a drawing will suffice.

Procedure

1. Share background information and vocabulary.
2. Working in groups of 3 to 4, students tell each other what the object conveys about their past.
3. In a class discussion, ask the following questions:
   a. Is it important for you to know about your past? Why or why not?
   b. Is it important to know about the human past? Why or why not?
   c. Humans have lived in Utah for at least 12,000 years. Is it important to know about their lives? Why or why not?
4. What can we learn from the past? The students brainstorm ideas. Some examples: how humans lived in the past and how and why human cultures changed over time.

Closure

If your past is important to you, what statement can you make about the importance of the past in general?

Extension

Repeat this lesson again at the close of your study of archaeology to demonstrate that students have broadened their understanding of archaeology and the past.

Reference

Lipe, William D., 1984, "Value and Meaning in Cultural Resources." In *Approaches to the Archaeological Heritage: A Comparative Study of World Cultural Resource Management Systems*, edited by Henry Cleere. Cambridge University Press, Cambridge, U.K.

2

CULTURE EVERYWHERE

SUBJECTS:	Social studies, language arts
SKILLS:	Knowledge, comprehension, analysis, evaluation
STRATEGIES:	Brainstorming, categorizing, discussion
DURATION:	30 to 45 minutes
CLASS SIZE:	Any

Objective

In their study of culture students will use a chart to:

1. Show the different ways that cultures meet basic human needs.
2. Recognize that archaeologists study how past cultures met basic needs by analyzing and interpreting the artifacts and sites that those cultures left behind.

Materials

"Comparing Cultures" activity sheet for each student.

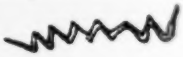
Vocabulary

archaeology: a method for studying human cultures by analyzing material evidence (artifacts and sites).

cultural relativism: studying other cultures without making judgments about them.

culture: the set of learned beliefs, values and behaviors generally shared by members of a society. "The way the members of a group of people think and believe and live, the tools they make, and the way they do things" (Braidwood, 1967, p. 30).

ethnocentrism: the attitude that one's traditions, customs, language, and values are the only right and proper way and that other cultures are inadequate or wrong.

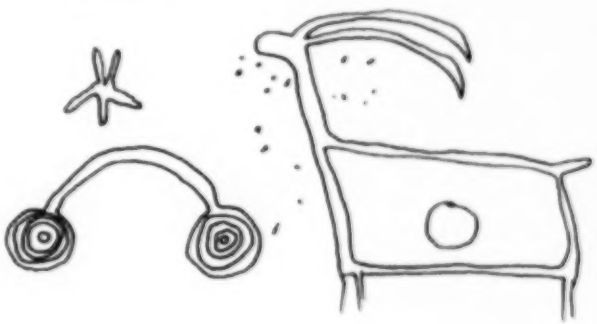


Background

All people everywhere have several basic needs which must be met. These basic needs may be categorized as follows:

1. The need for food and water (economics).
2. The need for protection from the elements (clothing and housing).
3. The need to reproduce the culture (marriage, kinship, education).
4. The need for explanation (religion, philosophy, science).

What must be satisfied is universally human. *How* needs are satisfied is cultural. The many different ways that cultures have evolved to meet the basic human needs results in the world's rich cultural diversity.



When studying other cultures, there is a tendency to emphasize the differences among people, and to look at other cultures ethnocentrically. Cultures with less sophisticated forms of technology are frequently portrayed as simple-minded and naive. However, on the contrary, such people often have unequaled understanding, knowledge and adaptability to the environments in which they live. It is important not to accentuate "them" and "us." When scientifically studying other cultures it is necessary to suspend judgment. One culture is neither better nor worse than another, just different. This is the concept of cultural relativism.

A basic assumption of archaeological study is that people who lived in the past had the same basic needs for existence as do people living in the present. Archaeologists study past cultures by analyzing material remains (artifacts and sites) and trying to determine how people met their basic needs.

Many people mistake archaeology for a swashbuckling "Indiana Jones" adventure, and archaeologists often are thought of as questing after rare and beautiful artifacts. Although it is true that at times archaeologists do find rare and beautiful things, they could more accurately be compared to Sherlock Holmes, a detective of the past, gradually piecing together the culture of a people to understand more about them. A lone artifact discloses almost nothing about a culture. It is by studying many sites and artifacts and their relationship to each other and the environment that one discovers the way people lived. Archaeologists study people's culture by studying the things they left behind.

Setting the Stage

List on the board students' responses to the following: What do you need to have in order to live? What did your great-grandmother need? What does a child in Africa need? What will humans need in the future?

Procedure

1. Students discover through the "Setting the Stage" activity that humans everywhere have similar needs. Now, help students categorize their list. They do not have to arrive at the four categories outlined above. Anthropologists themselves do not agree on how to categorize the needs. For example, the students may come up with eight needs: food, water, shelter, clothing, reproduction, transportation, education, and explanation.
2. Distribute the "Comparing Cultures" activity sheet to the students. Write the category of basic needs (food, shelter, etc.) down the vertical column on the chart's left side. Choose another culture to analyze—for example, an East African culture, the culture of Mexico, or any culture with which your students are familiar.
3. The students construct the chart, comparing and contrasting the basic human needs as they are met in different cultures.
4. In a class discussion, the students compare and contrast our culture with others. If different cultures seem strange or inferior to the students, inform them that our culture can be baffling to people from another culture. For example, Hindus are horrified at the thought of eating meat; it is against their religion to do so.
5. How do archaeologists study *past* cultures? Because archaeologists can neither ask the people who left the artifacts how they met their needs, nor observe them using the artifacts, past behavior must be inferred from the material remains of the culture. For example, if corn cobs are present archaeologists would infer that the people were farmers at least part of the year.

Note: Do not single out or make an example of students in your classroom who are from minority ethnic groups. The attention can be embarrassing and hurtful. However, welcome what these students might freely offer to the study of other cultures.

Closure

As the students analyze their charts, what can they say about the similarities and differences in the way cultures meet their basic needs? How do archaeologists study past cultures?

Evaluation

The students turn in their activity sheets for evaluation.

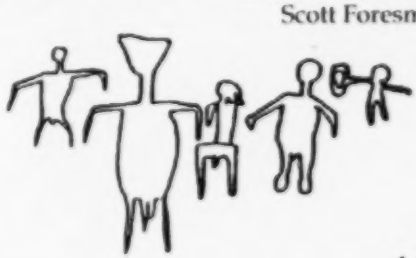
Links

Section Three, Lesson 21: "Archaeology and Ethnographic Analogy: The Anasazi and the Hopi"

Section Four, Lesson 33: "Utah Place Names"

Reference

Braidwood, Robert J., 1967, *Prehistoric Men*. 7th ed. Scott Foresman, Glenview, IL.



Comparing Cultures **Name** _____

Basic Needs	Us	Settlers	

Use additional sheets if necessary

3

OBSERVATION AND INFERENCE

SUBJECTS:	Science, social studies, language arts
SKILLS:	Knowledge, comprehension, application, analysis, evaluation
STRATEGIES:	Scientific inquiry, decision making, problem solving, writing
DURATION:	45 to 60 minutes
CLASS SIZE:	Any; groups of 2 to 4

Objective

In their study of observation and inference the students will use worksheets and coins to:

1. Differentiate between observation and inference through a problem-solving approach.
2. Demonstrate their knowledge by analyzing an archaeological artifact and creating their own observation-inference statements.

Materials

"Boy in the Water" activity sheet and master, and "An Ancient Coin" activity sheet for each student, and/or transparencies of each. A collection of foreign or U.S. coins (one per each student/team).

Vocabulary

artifact: any object made or used by humans.

data: information, especially information organized for analysis.

hypothesis: a proposed explanation accounting for a set of facts that can be tested by further investigation.

inference: a conclusion derived from observations.

observation: recognizing or noting a fact or occurrence.

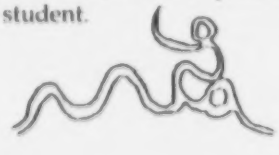
Background

Science is based on observation and inference. Any phenomenon being studied must first be observed, whether it be from a satellite or through a microscope. An inference is a proposed reason for an observation. The hypothesis is a chosen inference that the scientist will prove or disprove through testing.

Archaeologists use observation and inference to learn the story of past people. By making observations about objects (artifacts and sites) they infer the behavior of the people who used the objects. When archaeologists find the remains of a large village (observation), they could infer that the people were farmers. To test that inference (hypothesis), they would look for evidence of farming such as farming implements (like hoes), and food remains from crops (corn cobs and squash seeds). If they find these things, their hypothesis is verified. Archaeologists construct careful hypotheses and examine alternatives when making inferences from archaeological data.

Setting the Stage

1. Present students with a possible observation-inference scenario from their lives. Example: All the students in this classroom who ate in the cafeteria on Tuesday were ill on Wednesday (observation).
2. What many and varied reasons (proposed inferences) might there be for this illness? Examples: food poisoning, virus, a student uprising.
3. In what ways might one or more of these inferences (hypotheses) be tested in order to come to a conclusion about the cause of the illness? Examples: Send all the students to the school nurse for examination; test the food from Tuesday; obtain a medical history from the parents of each student.



Procedure

1. "Boy in the Water"
   a. Project or distribute the master of the "Boy in the Water." Project or distribute the "Boy in the Water" activity sheet.
   b. Read each statement and ask students to decide if it is a statement of observation or of inference. Ask them to give reasons for their answers.
   c. How might one or more of the inferences (hypotheses) be tested?
   d. Correct either as you proceed or immediately following the activity.
   e. Create a definition for observation, inference, and hypothesis.
2. "An Ancient Coin"
   a. Project or distribute the activity sheet "An Ancient Coin" and explain that the coin was found by an archaeologist at a site.
   b. Which statements are observations and which are inferences? Which observation is each inference based on?
   c. Many different inferences are possible from one observation. What other inferences might be made from observing this coin?
   d. Choose one inference (hypothesis) and think of ways archaeologists might test it by looking at other evidence at the site (e.g., If people are peace loving, archaeologists would not expect to find a lot of weapons or protective gear.)

Closure

Ask the students to summarize what they learned about the importance of observation, inference, and hypothesis in archaeology.

Evaluation

Be an archaeologist. Give each student/team a foreign or U.S. coin and ask them to pretend they have found the coin at an archaeological site. Ask them to create a list of observation statements and inference statements about the coin. Collect and correct their statements or have them exchange their statements with another student or team to work through. Each team will correct their original statements. Students choose one inference as their hypothesis and describe how they might test their hypothesis.

Links

Section Three, Lesson 17: "Artifact Classification"

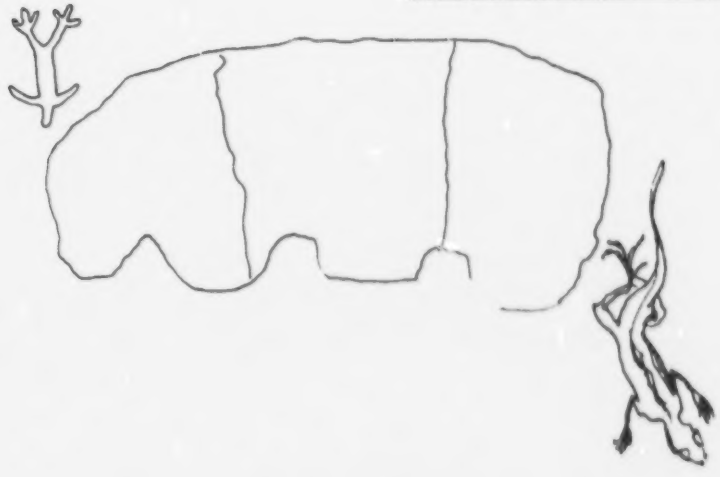
Section Three, Lesson 21: "Archaeology and Ethnographic Analogy: The Anasazi and the Hopi"

Boy in the Water Activity Sheet Answers

1. O	2. I	3. O	4. I	5. I	6. O	7. I	8. I	9. O
10. I	11. I	12. O	13. O	14. I	15. I	16. I		

An Ancient Coin Activity Sheet Answers

1. O	2. I	3. O	4. O	5. I	6. I



Boy In The Water

Boy in the Water **Name:** _____

Place an 'I' before the statements that are inferences, and an 'O' before the statements that are observations.

___ 1. The boy is in the water.

___ 2. The weather is cold.

___ 3. The tree branch is broken.

___ 4. If the boy crawled out of the water the goat would butt him.

___ 5. The boy fell off the branch.

___ 6. A goat is standing by the pond.

___ 7. The branch will fall on the boy's head.

___ 8. The boy fell off the rocks.

___ 9. There is a sailboat in the water.

___ 10. The sailboat belongs to the boy.

___ 11. The goat will soon leave the pond.

___ 12. The tree by the pond has no leaves on it.

___ 13. There are three rocks in the pond.

___ 14. The tree by the pond is dead.

___ 15. If it rains leaves will grow on the tree.

___ 16. The goat butted the boy into the pond.

An Ancient Coin **Name:** _____

Place an "I" before the statements that are inferences, and an "O" before the statements that are observations.

__ 1. There is a representation of a face on one side of the coin.

__ 2. The coin tells us that these were deeply religious people.

__ 3. The words "We Trust the Gods" are printed on the coin.

__ 4. On one side of the artifact is a drawing of leaves.

__ 5. We can tell from the artifact that these were peace-loving people.

__ 6. The face on the coin is a representation of the nation's king.

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CONTEXT

SUBJECTS:	Science, social studies, language arts
SKILLS:	Knowledge, comprehension, application, synthesis, evaluation
STRATEGIES:	Game, discussion, problem solving, writing
DURATION:	30 to 60 minutes
CLASS SIZE:	Any; groups of 5 to 6

Objective

In their study of context students will use a game and a discussion to demonstrate the importance of artifacts in context for learning about past people.

Materials

Index cards.

Vocabulary

context: the relationship artifacts have to each other and the situation in which they are found.

Background

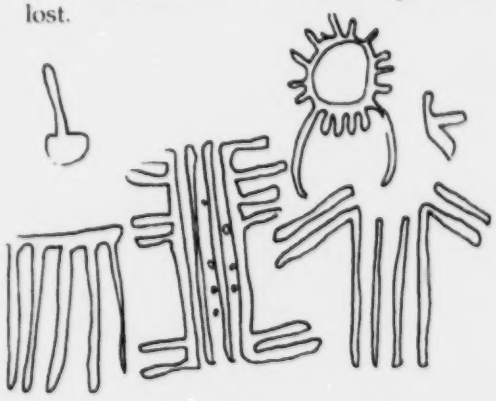
The things that people own or have made can tell something about the person. The objects a person has chosen to have can indicate the person's age, gender, and interests. For example, a baseball bat and a football helmet in someone's bedroom could suggest that the owner probably likes sports. Posters of pets and a collection of stuffed animals could mean that the person is an animal lover. The objects (artifacts) can only tell a complete story if they are found together, where their owners left them (in context).

Archaeologists rely on the objects that people made (artifacts) and where they left them (context) to learn the story of past people. Think of a prehistoric pottery bowl, beautifully painted. It has a very different meaning if it is found at a prehistoric site buried with someone than if it is found full of corn in an ancient storage room. Its meaning changes further if it is found in someone's modern living room—the bowl has now lost its original context and all connection with its prehistoric owners. It has become only a thing, no longer a messenger from the past.

Archaeologists preserve the context of artifacts they recover from sites by recording the location of everything they find. The artifact and its context provide more information to the archaeologist than could the artifact alone. When context is lost, information is lost.

Setting the Stage

1. Ask the students: If I had never met you and walked into your room, what would I know about you from the things you have there? Would I know if you were a boy or a girl? Would I know what your interests are? Would I know if you share your room?
2. Think of something in your room that is very special to you. How does that object tell something about you, along with everything else in your room? Everything together tells about you because it is in context. You have selected certain things to have, and these things tell about you when they are all found together.
3. Now imagine that your special object has been taken from you and is found in the city park. How does this change what could be known about you? When it is removed from your room, the object alone tells nothing, and your room is now missing an important piece of information about you. Context has been disturbed, and information about you is now lost.



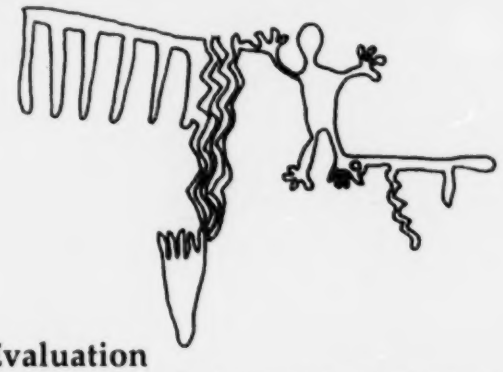
Procedure

The importance of context in archaeology can be demonstrated by the The Game of Context:

1. Tell the students they are going to play a game requiring that they think like archaeologists. Divide the class into groups of 5 to 6 students, and assign each group a different number. Give each student an index card and pencil. As a group, they are to choose a room or type of building such as a hospital operating room, a kitchen, or a hardware store. They decide what objects (artifacts) in the room make it distinctive; then each student writes one clue on his or her card, for a total of 5 to 6 clues per group. Each card also has the group number written on its back side.
2. The stack of cards from each group is passed to the next group, until every group has seen every stack and tried to infer the function of each place. Be sure the other groups do not hear the correct answers. Each time, before the cards are passed, have a student remove one card and place it off to the side so it does not get mixed up with the other sets of cards.
3. The teacher reviews each group's stack, asking how many groups correctly guessed the rooms' functions.
4. Ask: Is it possible to know the function of the room now? Is one object taken out of context (like a card removed at random) able to give as accurate a picture as are all of the objects in their place of origin? This demonstrates that removing artifacts from a site removes them from their context and makes it very difficult to get a complete understanding of past people.

Closure

Artifacts in context are the basis for all understanding about prehistoric people; archaeology is a science of context. Imagine that an archaeologist finds your classroom a thousand years from now. Can you make a statement about how artifacts in the context of your classroom will enable the archaeologist to learn about your class?



Evaluation

Have the students complete the "Context" activity sheet.

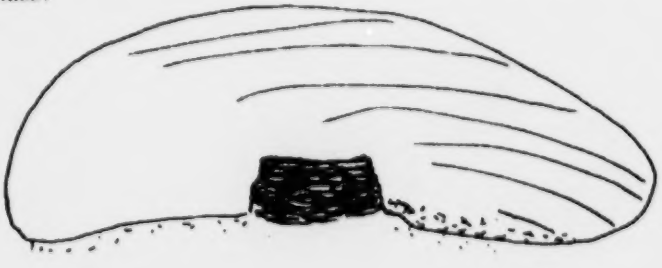
Links

Section Three, Lesson 15: "Gridding a Site"

Section Three, Lesson 16: "Stratigraphy and Cross-dating"

Context Activity Sheet Answers

1. List could include items such as ruffled curtains, posters, collections of dolls or model cars, certain types of clothing, photographs, other art work, the colors of furnishings, number of beds and dressers, souvenirs.
2. The listed items could indicate the student's sex, age, interests, places they have visited, their dreams and hopes, hobbies, amount of allowance, habits, and whether or not they shared their room.
3. Since these things are out of context, they tell nothing about their owner. In fact, it cannot be established if the artifacts once belonged together, so the story of their owner cannot be learned.
4. Artifacts and their context provide the evidence archaeologists need to learn about the past. If clues are removed or moved, information about the past is lost forever.



Context **Name:** _____

1. List ten things in your bedroom that would tell about you. Imagine the things on your list to be clues for an archaeologist.

2. Imagine an archaeologist finds your ten items. What might he/she know about you?

3. All of the things in your bedroom are in context. What could be learned about you if the things in your bedroom were scattered all over town?

4. Why is it important to leave artifacts in place at archaeological sites?

5

CHRONOLOGY: THE TIME OF MY LIFE

SUBJECTS:	Science, social studies, language arts
SKILLS:	Knowledge, comprehension, application, analysis, evaluation
STRATEGIES:	Discussion, problem solving, analogy, forecasting
DURATION:	45 to 60 minutes
CLASS SIZE:	Any; groups of 2

Objective

In their study of chronology the students will use personal time lines and an activity sheet to:

1. Attempt to order a classmate's timeline and demonstrate the importance of intact information to achieve accuracy.
2. Compare their timelines with the chronological information contained in a stratified archaeological site.

Materials

Ten strips of colored paper, scissors, glue, ruler; "The Time of My Life," "The Life of ___" and "Stratigraphic Section" activity sheets for each student.

Vocabulary

chronology: an arrangement of events in the order in which they occurred.

stratigraphy: the layering of deposits in archaeological sites. Cultural remains and natural sediments become buried over time; the layer on the bottom is the oldest, the layer on top is the youngest.

timeline: a visual representation of events in chronological order.

Background

The proper sequence of events must be known when trying to understand the past. Chronological order means that events are arranged in the order of occurrence, establishing a chronology. One way to display events visually in chronological order is with a timeline. A timeline is divided into equal time segments (month, year, or century, for example), with one end representing the oldest events and the other end the most recent events.

Chronology is something we all use everyday. When somebody tells us a story or when we watch a news report, it only makes sense if we can understand the story as it happened. Archaeologists always try to establish the age of the sites, artifacts, or events they are studying so that they can place them in chronological order. Each piece of information contributes some understanding to the overall story of the past, but only if the information can be placed in chronological order.

Archaeological data are often buried. Sites become buried by the deposition of small-grained particles (sand or dirt) through the action of wind, gravity, and water. When archaeologists dig a site, they record the location of what they find, so that chronological order can be established. Objects discovered at the bottom of pits dug by archaeologists are the oldest, while those near the surface are the youngest.

When vandals and artifact-seekers dig a site or collect artifacts from the surface, they remove objects which could place the site in time, and therefore, the archaeologist cannot learn the site's chronological placement. Vandals mix the stratigraphic layers together and archaeological events cannot be placed in order. (While events in our lives typically have a short time duration, archaeologists use the term "events" to signify lifeways over a span of time.) A page of the past has been torn up and thrown away, destroyed.

Everyone can help stop this problem by not digging in sites or collecting artifacts, by refusing to buy artifacts from people who dig and destroy sites, and by reporting people they see digging and collecting artifacts to law enforcement officials.

Setting the Stage

Tell the story of Goldilocks out of sequence, leaving some parts out. Ask students to describe the problems with the story. Why is it important to relate sequential information, including all the important details?

Procedure

1. Define chronology and state the necessity of establishing chronological order when studying the past.
2. Have the students list ten events in their lives, one on each of the ten strips of colored paper. Next to each event, students list or draw an object that might symbolize that event. These events should not have obvious time links, such as "my eighth birthday party", or "I started 4th grade." The events could be things like "my sister was born (rattle)", "the family moved (moving van)", "we went to Yellowstone on vacation (tent)." Students should try to include events from their entire lives.
3. They then shuffle their strips and exchange them with another student, who tries to lay the strips out in correct chronological order with the most recent at the top.
4. The two students who have exchanged strips then tell each other their best guess of the proper chronological order. The strips are then returned to their owners. This is usually a humorous experience for students.
5. Discuss: Were you able to reconstruct the timeline correctly? Why or why not? It is difficult, sometimes impossible, to reconstruct a story if the order of events is not known.
6. Ask students to randomly remove four events from their personal timeline. Ask students if the chronological order would have been more difficult to construct and if the story of their classmate would have been as complete if there were even fewer strips. Connect this activity to archaeological sites by stressing how archaeological data is usually impossible to place in chronological order if artifact collectors have dug up a site (like mixing up the event strips) or if people have removed artifacts (equivalent to removing some of the event strips).
7. Distribute the "The Life of ____" activity sheet (which forms the backing for the timeline). Students glue their own strips in chronological order beginning with the most recent event at the top on their backing paper. They can write the year of the event (or they can number the events one through ten) in the column to the left of their strips.

Closure

1. Distribute a copy of the "Stratigraphic Section" activity sheet to each student. Have them lay their timeline next to it.
2. Use the sheet and their timelines to explore the following questions:
   a. What do you notice about the information on the "Stratigraphic Section" activity sheet?
   b. In what ways is the "Stratigraphic Section" activity sheet similar to your timeline? In what ways is it different?
   c. Imagine that you cannot remember significant events in your life. How would that change the history of your life?
   d. Does digging in an archaeological site result in the loss of information about the past?
   e. In what ways is a hole dug by vandals in an archaeological site similar to a loss of significant events in your life?
   f. In summary, what might you say to an artifact collector about the importance of leaving sites undisturbed?

Evaluation

Have the students complete the "The Time of My Life" activity sheet or use it for a discussion. Or ask the students to present an extemporaneous persuasive speech that defines chronology as used by the archaeologist and explain the importance of intact sites for establishing chronological order.

Links

Section Three, Lesson 16: "Stratigraphy and Cross-Dating"

Section Three, Lesson 18: "Archaeology and Tree-Ring Dating"

Section Three, Lesson 19: "Pollen Analysis"

The Time of My Life Activity Sheet Answers

1. Students should express regret, or a feeling of being upset. For someone to wantonly destroy the only evidence of another's life indicates that they have little respect for the meaning of that person's life.
2. By extension of the previous question, students should link their feelings about destruction of their timeline to destruction of evidence of past peoples' lives.

The Time of My Life

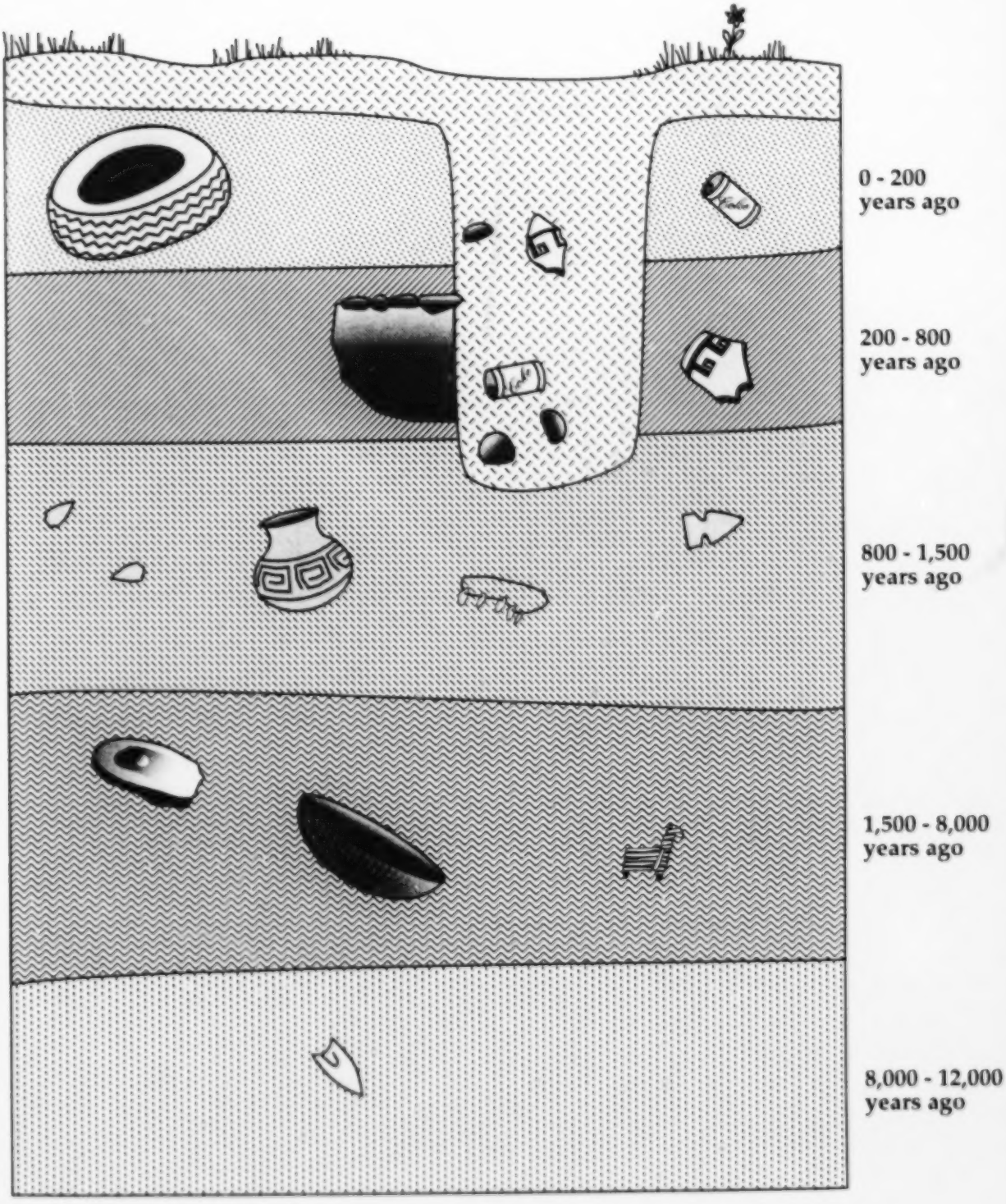
Name: _____

1. Write a short paragraph about how you would feel if your time line was all that would ever be known of you, and somebody tore part of it up.

2. How do you think an archaeologist feels when she or he visits a site that has been dug up by vandals?

The Life of _____	
Today	

Stratigraphic Section



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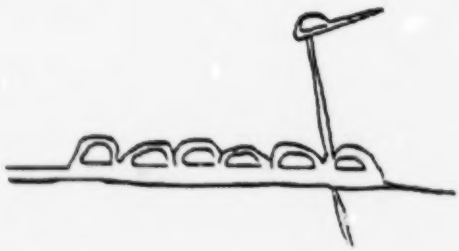
6

CLASSIFICATION AND ATTRIBUTES

SUBJECTS:	Science, language arts
SKILLS:	Knowledge, comprehension, application, analysis, evaluation
STRATEGIES:	Observation, classification, comparing and contrasting, scientific inquiry, decision making, writing
DURATION:	30 to 45 minutes
CLASS SIZE:	Any; groups of 3 to 4



Objective

In their study of classification and attributes students will use doohickey kits to:

1. Classify objects based on their attributes.
2. Explain why scientists and specifically archaeologists use classification.

Materials

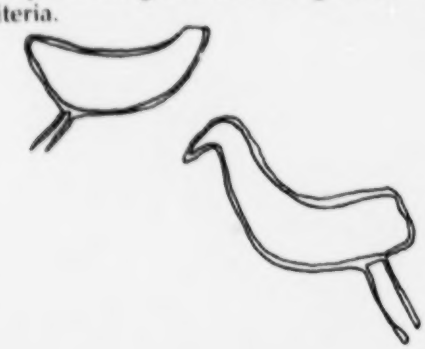
Doohickey kit for each group each kit containing about two dozen familiar objects, such as bolts, string, rocks, paper clips, and cloth; "Artifacts From A Mining Camp" activity sheet for each team.

Vocabulary

artifact: any object made or used by people.

attribute: characteristics or properties of an object such as size, color, or shape.

classification: systematic arrangement in groups or categories according to established criteria.



Background

A basic element of thinking is classification. We place objects and situations into conceptual categories in order to make sense of the world so we don't have to respond to each new object or situation as a completely new experience. Classification also helps us to sort a multitude of sensory impressions quickly and enables us "... to cope with complexity that might otherwise be overwhelming" (Hull, 1970, p. 150).

We classify objects almost automatically. This is accomplished by choosing certain attributes to pay attention to while ignoring others. We cannot take all attributes into account at once, therefore, we select only a few as being relevant to the task at hand. For example, if we have a group of blocks alike in every way except for color, then color is going to be the attribute used for categorization. If size is variable, then it, too, could become important for categorizing the objects.

Classification of data is an important part of any scientific study, including archaeology. Scientists must categorize data based on various attributes to reduce their complexity and to examine the relationships between types of data. For example, it is not possible to compare each individual house cat with every other member of the cat family. Instead, the category "house cat" includes creatures with certain shared attributes. All "house cats" are not identical, but all fall within a range of variation. The category "house cat" can then be compared with the category "tiger," or "lion," or "lynx."

Objects (artifacts) left by past people form the archaeological data base. Like all other scientists, archaeologists classify data (in this case artifacts and sites) into categories based on their attributes. A Fremont site might contain hundreds of pottery sherds which vary in appearance. An archaeologist cannot compare every pottery sherd to every other pottery sherd. Instead, he or she classifies the pottery into categories and compares the categories, thereby greatly decreasing the number of comparisons that have to be made.

Procedure

1. Divide the students into groups of 4 or 5 and give each group a doohickey kit. Have each group organize the objects into categories, using their own classification scheme.
2. When everyone is finished, ask each group to explain their scheme. Which attributes did they use to place an object in a certain category (shape, color, type of material, other)? Compare and contrast how each group chose to classify their objects.
3. Explore with the students the idea that one classification system is not better than another. The utility of a given classification system depends on what the classifier wants to know.
4. Devise some simple questions that might be answered by classifying the objects in the doohickey kits. For example: What colors are present? How many different shapes are there (name them)? How might these objects be used? The students will need to regroup the objects based on the question asked.
5. Archaeologists study artifacts using the same techniques. They bring the artifacts back to the laboratory, decide what they want to know, and organize the data accordingly.

Closure and Evaluation

1. Distribute a copy of "Artifacts From A Mining Camp" activity sheet to each team of students.
2. Have the students imagine they are archaeologists who have found an old mining camp. What questions might they ask about what happened in the past at this mining camp?
3. The students cut out the artifacts on the activity sheet. How might they classify these objects to answer their questions?
4. Summarize why classification is a useful tool for studying about the past.

Link

Section Three, Lesson 17: "Artifact Classification"

Reference

Hull, William P., 1970, "Attribute Games and Thinking Skills". In *The ESS Reader* by the Elementary Science Study of Educational Development Center, Inc., Newton, MA.

Artifacts from a Mining Camp

shovel	jacket	harmonica
pick	lunch box	3 rusted metal cans
old boot	1 fork	broken colored glass
nails	handkerchief	metal wash tub
miner's light	3 spoons	pocket knife
bed springs	boards	small wooden box cars
metal mug	rusted rail tracks	rusted pipe in hillside

7

SCIENTIFIC INQUIRY

SUBJECTS:	Science, social studies, language arts
SKILLS:	Application, analysis, synthesis, evaluation
STRATEGIES:	Scientific inquiry, classification, research skills, writing
DURATION:	45 to 60 minutes
CLASS SIZE:	Any; groups of 3 to 4

Objectives

In their study of scientific inquiry students will use an activity sheet to:

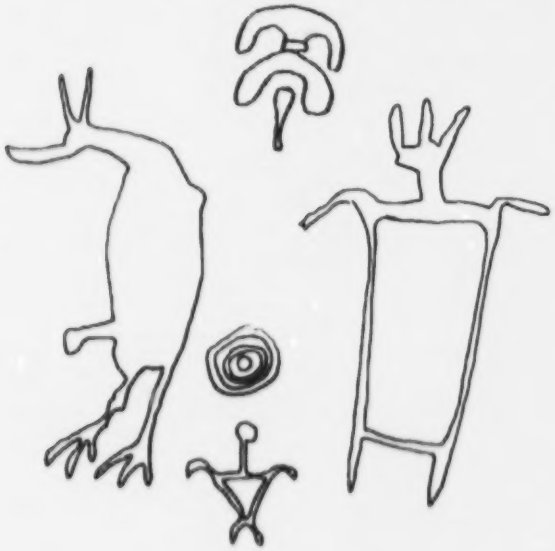
1. Make an inference about the behavior of a classmate and test it using artifacts.
2. Simulate how archaeologists learn about past people by designing and conducting a research project.

Materials

"Archaeological Inquiry" activity sheet for each student and group.

Vocabulary

artifact: any object made or used by people.



Background

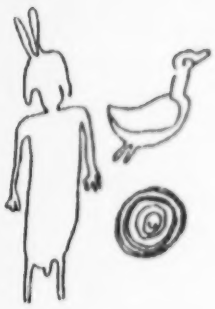
The goal of archaeological research is to answer questions about people who lived in the past. Hypotheses formation and classification are dependent on the chosen question. For example, if we want to learn about a settler family's income we could hypothesize that more nonessential items than essential items means they had an income sufficient to buy luxury goods. We would classify the relevant artifacts into two classes—essential items and nonessential items. Based on the outcome of the classification we would accept or reject our hypothesis.

Setting the Stage

Have students classify the contents of their own desks or lockers in whatever manner they choose. Items could be categorized as follows:

A. Writing instruments
   1. pencils
   2. crayons
B. Paper
C. Books
D. Miscellaneous
   1. gum
   2. money
   3. toys

Ask the students how they would proceed if they wanted to know something specific about the owner of a desk. This is how an archaeologist begins to study past cultures.



Procedure

1. Distribute a copy of "Archaeological Inquiry" activity sheet which the students will fill in as they are led through the following inquiry.
2. The inquiry process begins with a question. Archaeologists want to answer questions about past human behavior and must use material remains to do so. Ask the students to consider the following question: "Is the owner of the desk next to you a saver or a thrower-awayer?"
3. **Formulate an hypothesis:** If there is a large amount of items not required for school work in the desk, then the owner is a saver.
4. **Classify the data:** Only two categories are essential—items required for school work and items not required for school work. Discuss with the students differing ideas about what constitutes "required items," since this determines how objects are categorized.
5. To answer the research question, ask which category contains the largest number of objects. If there is a greater number of items that are not required, then we **accept the hypothesis**: the owner of the desk is a saver. The students have made an **inference** about the behavior of the desk's owner and have tested their inference (hypotheses) using classified objects.

Closure

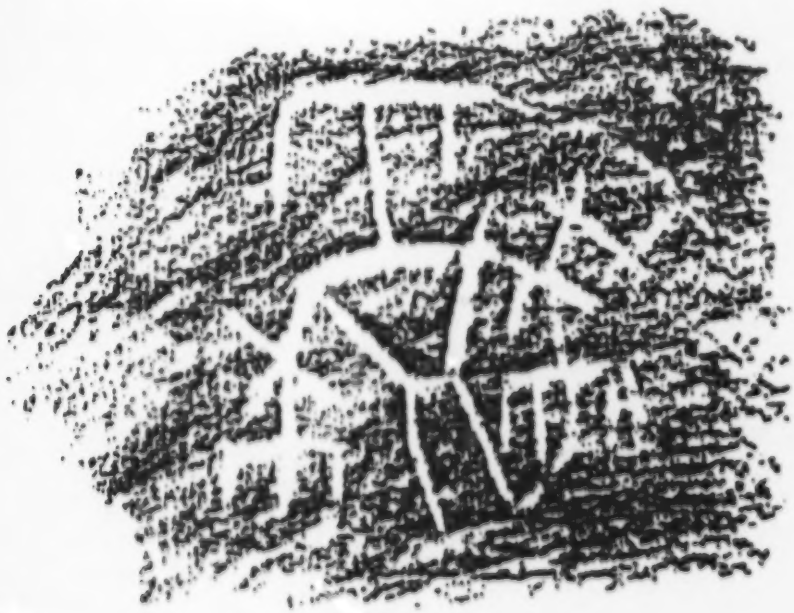
Divide class into groups of 3 to 5 students and give each group an "Archaeological Inquiry" activity sheet. Have them design and conduct an archaeological research project using objects in the school. Since students know the people in their class, it would be best to visit another teacher's room, the office, the lunchroom, etc. Each project must answer a question about the people who own or use the objects; e.g., what subjects are being studied at this point in time? Each group presents their results to the class.

Evaluation

Students turn in their "Archaeological Inquiry" activity sheets for evaluation.

Link

Section Three, Lesson 17: "Artifact Classification"



Archaeological Inquiry

Behavioral Question	Is the owner of the desk a saver or a thrower-awayer?
Hypothesis	If there is a large amount of items not required for school work in the desk, then the owner is a saver.
Classification Categories	items required for school work items not required for school work
Accept or Reject the Hypothesis	There is a greater quantity of items not required for school work than items required for school work, so I accept the hypothesis.
Make a Behavioral Inference	The owner of the desk is a saver.

Archaeological Inquiry **Name:** _____

Behavioral Question	
Hypothesis	
Classification Categories	
Accept or Reject the Hypothesis	
Make a Behavioral Inference	

8

IT'S IN THE GARBAGE

SUBJECTS:	Science, social studies, language arts
SKILLS:	Application, analysis, synthesis, evaluation
STRATEGIES:	Scientific inquiry, problem solving, discussion, forecasting, research skills, writing
DURATION:	60 to 90 minutes
CLASS SIZE:	Any; groups of 3 to 4

Objective

In their study of archaeological concepts, students will analyze garbage from different places to:

1. Demonstrate competence in applying the concepts of culture, context, classification, observation and inference, and chronology; and
2. Explain how their study of garbage relates to the methods of archaeology.

Materials

Filled wastebaskets or small garbage bags from several places in the school, home, or elsewhere, selected to represent rooms of different function; plastic tarps are useful when spreading the garbage out. Undesirable and unsanitary items, such as used tissues or rotting food remains, should not be included. "It's in the Garbage" activity sheet for each group; "Garbage Chart" activity sheet for each group (optional).

Vocabulary

artifact: any object made or used by humans.

chronology: an arrangement of events in the order in which they occurred.

context: the relationship artifacts have to each other and the situation in which they are found.

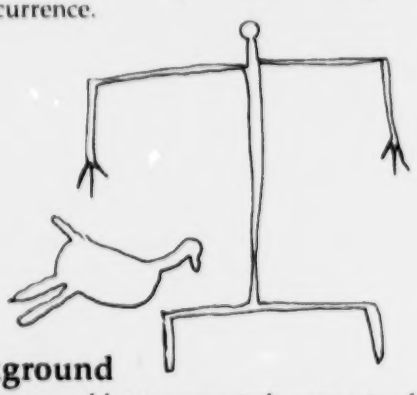
culture: the set of learned beliefs, values and behaviors generally shared by members of a society. "The way the members of a group of people think and believe and live, the tools they make, and the way they do things" (Braidwood, 1967, p. 30).

evidence: data which are used to prove a point, or which clearly indicate a situation.

inference: a conclusion derived from observations.

midden: an area used for trash disposal.

observation: recognizing or noting a fact or occurrence.



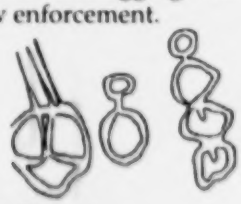
Background

The unusable or unwanted remnants of everyday life end up in the garbage. By studying what people have thrown away, archaeologists can learn a great deal about a culture. This is true not only of prehistoric peoples who left no written record about their lives, but also of people today. Bill Rathje, an archaeologist, studies the garbage of Americans. He has learned many things about the relationships of human behavior and trash disposal, information useful in studying people of the past and the present. He has found that people will often tell an interviewer what they believe is appropriate behavior, but their garbage tells another story. People frequently say they eat lots of fruit and vegetables, yet their garbage shows they do not. Another example is that people say they recycle more than they actually do (Rathje, 1984, p. 27).

Just as we do not throw our trash any old place, neither did prehistoric people. Their garbage heaps are called middens, and are a rich source of archaeological information about their lifeways. Layers of trash also tell a story over time. Archaeologists excavate middens slowly and carefully, recording the location of each artifact and sample recovered

from the midden. They analyze the tiny fragments of prehistoric meals (bone slivers, seed hulls, plant parts) and charcoal from cooking fires. The animals and plants these remains came from can be identified and archaeologists can learn very precise information about the economy of past people.

If a midden is disturbed and the layers mixed, it becomes impossible to interpret the lifeways of past people. Vandals looking for artifacts dig in middens and they destroy irreplaceable information about the past. They tear pages from the history book of time. Everyone can help by not digging archaeological sites or collecting artifacts, by refusing to buy artifacts from people who do, and by always reporting anyone seen digging at sites or collecting artifacts to law enforcement.



Setting the Stage

A famous anthropologist, Franz Boas, reportedly said "... man never lies to his garbage heap." What do you think your family's garbage could tell about you? (Examples: family size, income, preferred foods and activities).

Procedure

1. Review the concepts learned in Section One: **culture**, **context**, **observation-inference**, **classification**, and **chronology**. Students will be applying these concepts to their study of garbage.
2. Explain to the students that they are going to be archaeologists, analyzing garbage (middens) to learn about the people who threw it away. Demonstrate some of the information that can be learned from garbage by examining a small amount of trash from your classroom trash can:
   a. What **culture** is this garbage from? Could the garbage be mistaken for that of another culture? Is the garbage in your classroom trash the same or different from classroom garbage in China? Portugal? Your town 100 years ago? Are basic human needs represented in the trash?
   b. What can you **infer** about the behavior of the thrower-awayers and the origin of the garbage based on your **observations**? Is cafeteria trash the same as that from the wood shop? the library? How is a single person's garbage different from that of a family with many children? Is a vegetarian's trash different from a meat-eater's?
   c. Arrange the trash in **chronological** order. On the bottom is the oldest trash, on the top is the most recent garbage. If you find dated items through the trash, such as newspapers or postmarked envelopes or product dates, you can establish a precise date for the trash.
   d. Sort the trash into piles based upon some type of similarity. This is a **classification**, perhaps including categories like paper, food containers, other office supplies.
   e. The trash is obviously from a classroom because you have preserved its **context**, the relationship artifacts have to each other and the situation in which they occur. If you went to your town's landfill, you might find some of the artifacts from your classroom trash but you could not interpret it as coming from your classroom because it has been all mixed up with trash from many other places. Its context has been lost.
3. Divide the class into groups of 4 to 6 students and give each group a bag of trash. The group analyzes their trash using the activity sheet "It's in the Garbage" (and optionally the "Garbage Chart").
4. Students visit each other's "middens," and a spokesperson from each group presents a summary of their findings.

Closure

Lead a discussion using the "Garbage Concepts" questions.

Evaluation

Collect the students' activity sheets and reports.

Links

Section Three, Lesson 16: "Stratigraphy and Cross-Dating"

Section Three, Lesson 17: "Artifact Classification"

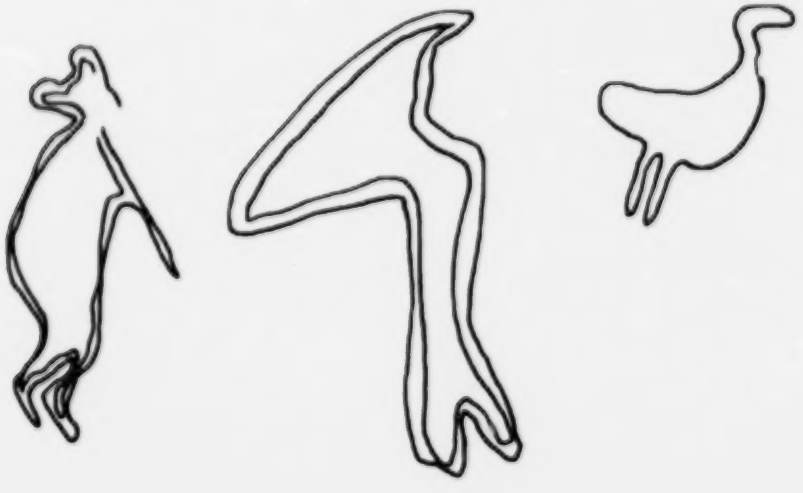
References

Rathje, William L., 1984, "The Garbage Decade." *American Behavioral Scientist* 28(1), pp. 9-39.

Rathje, William L., 1991, "Once and Future Landfills." *National Geographic* 179(5), pp.116-134.

GARBAGE CONCEPTS

Question	Concept
[When students propose an inference about the people who generated the garbage] What would the activity you are proposing (hypothesis) look like archaeologically? What artifacts would you expect to find if your hypothesis is correct?	When archaeologists suspect a certain behavior was occuring, they make an hypothesis about what the archaeological evidence would look like. For example, we could hypothesize that people butchered large game where it was killed and only took the most desirable parts back to their village. In excavating the village, archaeologists would prove or disprove their hypothesis based upon the animal bones present.
Does your study of your garbage tell you everything about American society? Why or why not?	One sample is only a glimpse into a complex society. Just as you only see a small piece of our culture from one sample, so too archaeologists see only a sliver of the past from one site.
Do the contents of your garbage can change throughout the year? . . . as a result of special occasions like birthdays or company for dinner? What mistakes might an archaeologist make about your family if he/she studied only the garbage from those special events?	Just as someone who wants to completely understand your family would study your garbage over a long period of time, an archaeologist studies many sites because one site cannot reflect the range of activities of a prehistoric society.
How would the results of your study be different if we had mixed your individual garbage bags all together into one heap?	Context would have been lost, and only very general statements abou the culture that generated the garbage could then be made. This is what happens when vandals dig up sites and say the artifacts are preserved, therefore, no information has been lost.



It's in the Garbage

Name: _____

Directions: Use this activity sheet to take notes during your "excavation." When you have completed your excavation, use the information to write a report about the garbage that addresses the items below. You must give reasons for your answers based on the "evidence"—the artifacts which support your answer.

1. Could you tell when your garbage was thrown away? If yes, how? If no, why not?

2. List two or more inferences you can make about the person(s) who threw the trash away.

3. From where did your garbage come?

4. Which basic human needs does your garbage show are being met?

5. Name two or more of the categories into which you classified your trash.

6. How do you know this garbage is of this culture?

Garbage Chart **Name** _____

Sketch of Item	Description of item (Observation)	Guess as to use or purpose (Inference)

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